LAMPIRAN III
KEPUTUSAN MENTERI KOMUNIKASI DAN INFORMATIKA REPUBLIK INDONESIA
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TENTANG
STANDAR TEKNIS ALAT TELEKOMUNIKASI DAN/ATAU PERANGKAT TELEKOMUNIKASI BERGERAK SELULER BERBASIS STANDAR *TEKNOLOGI LONG TERM EVOLUTION* DAN STANDAR TEKNOLOGI *INTERNATIONAL MOBILE TELECOMMUNICATIONS-2020*

STANDAR TEKNIS ALAT TELEKOMUNIKASI DAN/ATAU PERANGKAT TELEKOMUNIKASI *REPEATER* BERBASIS STANDAR TEKNOLOGI *LONG TERM EVOLUTION*

BAB I
KETENTUAN UMUM

A. Definisi

1. Repeater adalah perangkat yang mempunyai fungsi menerima dan menguatkan sinyal berisikan data yang dipasang di titik-titik tertentu dalam sebuah jaringan.

B. Singkatan

1. 3GPP : *The 3rd Generation Partnership Project*
2. AC : *Alternating Current*
3. ACRR : *Adjacent Channel Rejection Ratio*
4. BS : *Base Station*
5. BW : *Bandwidth*
6. CISPR : *Comité Internationale Spécial des Perturbations Radioelectrotechnique*
7. CW : *Continuous Wave*
8. dB : *decibel*
9. dBm : *decibel-milliwatts*

10. DC : *Direct Current*
11. EN : *European Standard*
12. ETSI : *European Telecommunications Standards Institute*
13. E-UTRA : *Evolved UMTS Terrestrial Radio Access*
14. f : *Frequency*
15. FDD : *Frequency Division Duplex*
16. GHz : *Giga Hertz*
17. Hz : *Hertz*
18. IEC : *International Electrotechnical Commission*
19. kHz : *kilo Hertz*
20. MHz : *Mega Hertz*
21. NR : *New Radio*
22. P : *Power*
23. RF : *Radio Frequency*
24. SELV : *Safety Extra Low Voltage*
25. SNI : *Sandar Nasional Indonesia*
26. TDD : *Time Division Duplex*
27. TS : *Technical Specification*
28. UTRA : *UMTS Terrestrial Radio Access*
29. V : *Volt*

BAB II
PERSYARATAN TEKNIS

A. Persyaratan Umum

1. Catu Daya

Repeater LTE dapat dicatu dengan daya AC atau DC.

Untuk *Repeater* LTE yang dicatu daya AC, semua tolok ukur parameter harus terpenuhi saat menggunakan catu daya tegangan AC 220 V ± 10% dan frekuensi 50 Hz ± 2%. Bila menggunakan catu daya eksternal (misalnya *converter* daya AC/DC), catu daya eksternal tidak boleh mempengaruhi kemampuan perangkat untuk memenuhi semua tolok ukur parameter teknis.

2. Persyaratan Keselamatan Listrik

Penilaian keselamatan listrik perangkat harus memenuhi persyaratan yang ditentukan dalam SNI IEC 60950-1:2016, SNI IEC 62368-1:2014, atau IEC 62368-1, dengan parameter yang harus dipenuhi adalah:

a. tegangan berlebih atau kuat listrik atau kuat dielektrik; dan
b. arus bocor atau arus sentuh.

Pengujian parameter dilakukan berdasarkan asumsi berikut:

a. Perangkat dicatu secara terus-menerus dengan sebuah catu daya eksternal khusus (konverter AC/DC atau adaptor/pengisi daya) atau dengan catu daya AC; dan
b. Perangkat beroperasi dengan SELV pada lingkungan dimana kelebihan tegangan dari jaringan telekomunikasi mungkin terjadi. SELV merujuk pada tegangan yang tidak melebihi 42,4 V puncak atau 60 V DC.

Untuk penilaian keselamatan Perangkat Telekomunikasi Repeater LTE yang dilakukan dengan pendekatan berbasis risiko, proses yang ditentukan dalam IEC 62368-1 berikut harus digunakan:

a. Identifikasi sumber energi dalam Perangkat Telekomunikasi Repeater LTE;
b. Klasifikasi sumber energi (dampak pada tubuh atau material yang mudah terbakar, seperti kemungkinan cedera atau pengapian);
c. Identifikasi usaha perlindungan terhadap sumber energi; dan
d. Mempertimbangkan efektifitas usaha perlindungan dengan mempertimbangkan kriteria pemenuhan atau standar yang ditentukan dalam standar IEC 62368-1

3. Persyaratan EMC

Repeater LTE harus diklasifikasikan sebagai *fixed equipment,* atau *vehicular equipment*. *Fixed equipment* adalah perangkat yang dipasang secara tetap (*fixed location permanently*) atau dicatu daya menggunakan catu daya AC. *Vehicular equipment* adalah perangkat yang digunakan dalam kendaraan dan dicatu daya menggunakan baterai utama kendaraan.

a. Kekebalan

Persyaratan kekebalan sesuai dengan peraturan perundang-undangan yang berlaku.

b. Emisi

i. *Repeater* LTE wajib memenuhi SNI IEC CISPR 32:2015, IEC CISPR 32, atau ETSI EN 301 489-50 yang merujuk pada ETSI EN 301 489-1.

ii. Pengukuran emisi berikut ini harus dilakukan pada *Repeater* LTE apabila memungkinkan sesuai SNI CISPR 32:2016, IEC CISPR 32, atau ETSI EN 301 489-50:

1) Emisi radiasi pada *enclosure of ancillary equipment* yang tidak tergabung dengan perangkat harus memenuhi persyaratan yang ditentukan pada Tabel A.4 dan A.5 untuk kelas B dan Tabel A.2 dan A.3 untuk kelas A pada SNI IEC CISPR 32:2015. Klasifikasi kelas A dan B sesuai dengan klausul 4 pada SNI IEC CISPR 32:2015;

2) Emisi konduksi pada port daya DC untuk *fixed equipment* dan *vehicular equipment* harus memenuhi persyaratan yang ditentukan pada Tabel A.9 pada SNI IEC CISPR 32:2015;

3) Emisi konduksi pada port daya AC untuk *fixed equipment* harus memenuhi persyaratan yang ditentukan pada Tabel A.9 untuk kelas A atau A.10 untuk kelas B pada SNI IEC CISPR 32:2015 (peralatan dengan port daya DC yang ditenagai oleh converter daya AC/DC khusus atau adaptor yang didefinisikan sebagai peralatan bertenaga listrik AC [Klausul 3.1.1 dari SNI IEC CISPR 32:2015]). Klasifikasi kelas A dan B sesuai dengan klausul 4 pada SNI IEC CISPR 32:2015;

4) Emisi konduksi pada port jaringan kabel (*wired network port*) untuk *fixed equipment* harus memenuhi persyaratan yang ditentukan pada Tabel A.11 untuk kelas A atau A.12 untuk kelas B pada SNI IEC CISPR 32:2015. Klasifikasi kelas A dan B sesuai dengan klausul 4 pada SNI IEC CISPR 32:2015.

B. Persyaratan Utama

Persyaratan utama yang wajib dipenuhi *Repeater* dengan parameter sebagai berikut:

1. Frekuensi Kerja

Repeater hanya dapat beroperasi pada pita frekuensi radio yang tertera pada Tabel 1.

Tabel 1. Frekuensi Kerja *Repeater*.

NR *operating band*	Uplink (MHz)	Downlink (MHz)	Mode Dupleks
1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
5	824 MHz – 849 MHz	869 MHz – 894 MHz	FDD
8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD

2. Parameter Uji

Repeater harus memenuhi Parameter uji yang dinyatakan pada Tabel 2 pada kondisi normal.

Tabel 2. Parameter Uji dan Batas Nilai *Repeater*

Parameter Uji	Batas Nilai
Repeater Output Power	Sesuai dengan: a) Tabel 3; b) Klausul 6 ETSI TS 136 106; c) Klausul 4.2.4 ETSI EN 301 908-15; atau d) Klausul 6 pada dokumen ETSI TS 136 143
ACRR	Sesuai dengan: a) Tabel 4; b) Klausul 13 ETSI TS 136 106; c) Klausul 4.2.7 ETSI EN 301 908-15; atau d) Klausul 13 pada dokumen ETSI TS 136 143
Operating Band Unwanted Emissions	Sesuai dengan: a) Tabel 5 sampai dengan Tabel 14; b) Klausul 9.1 ETSI TS 136 106; c) Klausul 4.2.2 ETSI EN 301 908-15; atau d) Klausul 9.1 pada dokumen ETSI TS 136 143
Repeater Spurious Emission 3)	Sesuai dengan: a) Tabel 15 sampai dengan Tabel 16; b) Klausul 9.2 ETSI TS 136 106; c) Klausul 4.2.3 ETSI EN 301 908-15; atau d) Klausul 9.2 pada dokumen ETSI TS 136 143
Repeater Input Intermodulation 3)	Sesuai dengan: a) Tabel 17 sampai dengan Tabel 20; b) Klausul 11 ETSI TS 136 106; c) Klausul 4.2.5 ETSI EN 301 908-15; atau d) Klausul 11 pada dokumen ETSI TS 136 143
Repeater Output Intermodulation	Sesuai dengan: a) Tabel 5 sampai dengan Tabel 16 dengan i*nterfering* dan *wanted signals* sesuai dengan Tabel 21; b) Klausul 12 ETSI TS 136 106; c) Klausul 4.2.8 ETSI EN 301 908-15; atau d) Klausul 12 pada dokumen ETSI TS 136 143
Radiated Emission	Sesuai dengan: a) Klausul 4.2.3 ETSI EN 301 908-1; b) Klausul 8.2.1 ETSI TS 136 113; atau c) Klausul 8.2.1 3GPP TS 36.113
Catatan: 1) ETSI TS 136 143 dapat diganti dengan 3GPP TS 36.143 2) ETSI TS 136 106 dapat diganti dengan 3GPP TS 36.106 3) Parameter *Repeater Spurious Emission* dan *Repeater Input Intermodulation* untuk *Co-location* dengan *Repeater* atau *BS* lain termasuk *voluntary*.	

Tabel 3. *Repeater output power; normal conditions*

Rated output power	Carrier frequency	Limit
P ≥ 31 dBm	f ≤ 3,0 GHz	+2,7 dB and -2,7 dB
	3,0 GHz < f ≤ 4,2 GHz	+3,0 dB and -3,0 dB
P < 31 dBm	f ≤ 3,0 GHz	+3,7 dB and -3,7 dB
	3,0 GHz < f ≤ 4,2 GHz	+4,0 dB and -4,0 dB

Tabel 4. *Repeater ACRR Co-existence with UTRA*

Co-existence with other systems	Repeater maximum output power	Channel offset from the centre frequency of the first or last 5 MHz channel within the pass band	ACRR limit
UTRA	P ≥ 31 dBm	5 MHz	32,3 dB
	P ≥ 31 dBm	10 MHz	32,3 dB
	P < 31 dBm	5 MHz	19,3 dB
	P < 31 dBm	10 MHz	19,3 dB
NOTE: Repeater maximum output power as defined in ETSI EN 301 908-11 [**Error! Reference source not found.**].			

Tabel 5. *General operating band unwanted emission limits for repeater pass band lower than 5* MHz *for (*E-UTRA *bands 1, 3, or 8)*

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < 0,2 MHz	0,015 MHz ≤ f_offset < 0,215 MHz	-12,5 dBm	30 kHz
0,2 MHz ≤ Δf < 1 MHz	0,215 MHz ≤ f_offset < 1,015 MHz	$-12{,}5dBm - 15 * \left(\frac{f\_offset}{MHz} - 0{,}215 \right) dB$	30 kHz
	1,015 MHz ≤ f_offset < 1,5 MHz	-24,5 dBm	30 kHz
1 MHz ≤ Δf < 2 × $BW_{Pass\ band}$	1,5 MHz ≤ f_offset < 2 × $BW_{Pass\ band}$ + 0,5 MHz	-11,5 dBm	1 MHz
2 × $BW_{Pass\ band}$ ≤ Δf ≤ Δf_{max}	2 × $BW_{Pass\ band}$ + 0,5 MHz ≤ f_offset < f_offset_{max}	-15 dBm	1 MHz
NOTE 1: Frequencies and bandwidth are given in MHz. NOTE 2: If the repeater input signal consists of E-UTRA signals with a channel bandwidth of 1,4 MHz or 3 MHz placed so that the channel edge is less than 200 kHz from the pass band edge, the requirements in table 4.2.2.2.1-3 supersede table 4.2.2.2.1-1 for applicable frequency offsets.			

Tabel 6. *General operating band unwanted emission limits for repeater pass band 5* MHz *and above for (*E-UTRA *band 1, 3, or 8)*

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < 0,2 MHz	0,015 MHz ≤ f_offset < 0,215 MHz	-12,5 dBm	30 kHz
0,2 MHz ≤ Δf < 1 MHz	0,215 MHz ≤ f_offset < 1,015 MHz	$-12{,}5\ dBm - 15 * \left(\frac{f\_offset}{MHz} - 0{,}215 \right) dB$	30 kHz
	1,015 MHz ≤ f_offset < 1,5 MHz	-24,5 dBm	30 kHz
1 MHz ≤ Δf < 10 MHz	1,5 MHz ≤ f_offset < 10,5 MHz	-11,5 dBm	1 MHz
10 MHz ≤ Δf ≤ Δf_{max}	10,5 MHz ≤ f_offset < f_offset_{max}	-15 dBm	1 MHz
NOTE 1: Frequencies and bandwidth are given in MHz. NOTE 2: If the repeater input signal consists of E-UTRA signals with a channel bandwidth of 1,4 MHz or 3 MHz placed so that the channel edge is less than 200 kHz from the pass band edge, the requirements in table 4.2.2.2.1-3 supersede table 4.2.2.2.1-2 for applicable frequency offsets.			

Tabel 7. *Conditional operating band unwanted emission limits for (*E-UTRA *band 1,3, or 8)*

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < 0,05 MHz	0,015 MHz ≤ f_offset < 0,065 MHz	$6{,}5\ dBm - 60 \cdot \left(\frac{f\_offset}{MHz} - 0{,}015 \right) dB$	30 kHz
0,05 MHz ≤ Δf < 0,15 MHz	0,065 MHz ≤ f_offset < 0,165 MHz	$3{,}5\ dBm - 160 \cdot \left(\frac{f\_offset}{MHz} - 0{,}065 \right) dB$	30 kHz
0,15 MHz ≤ Δf < 0,2 MHz	0,165 MHz ≤ f_offset < 0,215 MHz	-12,5 dBm	30 kHz
NOTE: Frequencies and bandwidth are given in MHz.			

Tabel 8. *General operating band unwanted emission limits for repeater pass band bandwidth lower than 5* MHz *(*E UTRA *bands 28)*

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < $BW_{Pass\ band}$	$BW_{Meas}/2$ ≤ f_offset < $BW_{Pass\ band}$ + $BW_{Meas}/2$	$Max\left[-2{,}5 * BW_{Passband} + 2{,}5; -1 * BW_{Passband} - 2\right] dBm + \frac{Max\left[-10; 1{,}5 * BW_{Passband} - 14{,}5\right]}{BW_{Passband}} * \left(f\_offset - \frac{BW_{meas}}{2} \right) dB$ + 1,5 dB	100 kHz
$BW_{Pass\ band}$≤ Δf < 2*$BW_{Pass\ band}$	$BW_{Pass\ band}$ + $BW_{Meas}/2$ ≤ f_offset < 2* $BW_{Pass\ band}$ + $BW_{Meas}/2$	$Max\left[-2{,}5 * BW_{Passband} - 7{,}5; 0{,}5 * BW_{Passband} - 16{,}5\right] dBm$ + 1,5 dB	100 kHz
2*$BW_{Pass\ band}$ ≤ Δf ≤ Δf_{max}	2* $BW_{Pass\ band}$ + $BW_{Meas}/2$ ≤ f_offset < f_offset_{max}	-16 dBm	100 kHz
NOTE 1: Frequencies and bandwidth are given in MHz. NOTE 2: If the repeater input signal consists of E-UTRA signals with a channel bandwidth of 1,4 MHz placed so that the channel edge is less than 200 kHz from the pass band edge, the requirements in table 4.2.2.2.1-10 supersedes tables 4.2.2.2.1-8 and 4.2.2.2.1-9 for applicable frequency offsets. NOTE 3: If the repeater input signal consists of E-UTRA signals with a channel bandwidth of 3 MHz placed so that the channel edge is less than 200 kHz from the pass band edge, the requirements in table 4.2.2.2.1-11 supersedes tables 4.2.2.2.1-8 and 4.2.2.2.1-9 for applicable frequency offsets.			

Tabel 9. *General operating band unwanted emission limits for repeater pass band bandwidth 5* MHz *and above (*E UTRA *bands 28)*

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0,05 MHz ≤ f_offset < 5,05 MHz	$-5{,}5\ dBm - \frac{7}{5} \cdot \left(\frac{f\_offset}{MHz} - 0{,}05 \right) dB$	100 kHz
5 MHz ≤ Δf < 10 MHz	5,05 MHz ≤ f_offset < 10,05 MHz	-12,5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10,05 MHz ≤ f_offset < f_offset_{max}	-16 dBm	100 kHz
NOTE 1: Frequencies and bandwidth are given in MHz. NOTE 2: If the repeater input signal consists of E-UTRA signals with a channel bandwidth of 1,4 MHz placed so that the channel edge is less than 200 kHz from the pass band edge, the requirements in table 4.2.2.2.1-10 supersedes tables 4.2.2.2.1-8 and 4.2.2.2.1-9 for applicable frequency offsets. NOTE 3: If the repeater input signal consists of E-UTRA signals with a channel bandwidth of 3 MHz placed so that the channel edge is less than 200 kHz from the pass band edge, the requirements in table 4.2.2.2.1-11 supersedes tables 4.2.2.2.1-8 and 4.2.2.2.1-9 for applicable frequency offsets.			

Tabel 10. *Conditional operating band unwanted emission limits for repeater input signal bandwidth of 1,4* MHz *(*E UTRA *bands 28)*

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < 1,05 MHz	0,05 MHz ≤ f_offset < 1,1 MHz	$+0{,}5\ dBm - \frac{10}{1{,}4} \cdot \left(\frac{f\_offset}{MHz} - 0{,}05 \right) dB$	100 kHz
NOTE: Frequencies and bandwidth are given in MHz.			

Tabel 11. *Conditional operating band unwanted emission limits for repeater input signal bandwidth of 3* MHz *(*E UTRA *bands 28)*

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth
0 MHz ≤ Δf < 1,05 MHz	0,05 MHz ≤ f_offset < 1,1 MHz	$-3{,}5\ dBm - \frac{10}{3} \cdot \left(\frac{f\_offset}{MHz} - 0{,}05 \right) dB$	100 kHz
NOTE: Frequencies and bandwidth are given in MHz.			

Tabel 12. *Uplink operating band unwanted emissions limits for protection of the* BS *receiver*

Maximum level	Measurement bandwidth	Note
-53 dBm	100 kHz	
NOTE 1: These requirements in table 4.2.2.2.2-1 for the uplink direction of the Repeater reflect what can be achieved with present state of the art technology and are based on a coupling loss of 73 dB between a Repeater and an E-UTRA FDD BS receiver. NOTE 2: The requirements shall be reconsidered when the state of the art technology progresses.		

Tabel 13. UTRA *Repeater down-link operating band unwanted emission limits for protection of adjacent band services*

Operating Band	Band	Maximum Level	Measurement Bandwidth
1	2 100 MHz to 2 105 MHz	-30 + 3,4 (f - 2 100 MHz) dBm	1 MHz
	2 175 MHz to 2 180 MHz	-30 + 3,4 (2 180 MHz - f) dBm	1 MHz

Tabel 14. *Declared emissions levels for protection of* DTT

Filter centre frequency, F_{filter}	Measurement bandwidth	Declared emission level [dBm]
F_{filter} = 8*N + 306 (MHz); 21 ≤ N ≤ 60	8 MHz	$P_{EM,N}$

Tabel 15. *General spurious emissions limits*

Frequency range	Maximum level	Measurement bandwidth	Note
9 kHz ↔ 150 kHz	-36 dBm	1 kHz	Note 1
150 kHz ↔ 30 MHz	-36 dBm	10 kHz	Note 1
30 MHz ↔ 1 GHz	-36 dBm	100 kHz	Note 1
1 GHz ↔ 12,75 GHz	-30 dBm	1 MHz	Note 2
12,75 GHz ↔ 5th harmonic of the upper frequency edge of the downlink or uplink operating band for downlink or uplink spurious emissions, respectively	-30 dBm	1 MHz	Note 2, note 3
NOTE 1: Bandwidth as in Recommendation ITU-R SM.329-12 section 4.1. NOTE 2: Bandwidth as in Recommendation ITU-R SM.329-12 section 4.1. Upper frequency as in Recommendation ITU-R SM.329-12 section 2.5, table 1. NOTE 3: Applies only for Bands 22.			

Tabel 16. *Spurious emissions limits for* E-UTRA-FDD *repeater in geographic coverage area of systems operating in other frequency bands*

Protected system	Frequency range for co-existence requirement	Maximum Level	Measurement Bandwidth	Note
GSM900	921 MHz to 960 MHz	-57 dBm	100 kHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 8.
	876 MHz to 915 MHz	-61 dBm	100 kHz	This requirement shall not apply to the uplink of E-UTRA FDD Repeater operating in band 8, since it is already covered by the requirement in clause 4.2.2.2.2.
DCS1800	1 805 MHz to 1 880 MHz	-47 dBm	100 kHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 3.
	1 710 MHz to 1 785 MHz	-61 dBm	100 kHz	This requirement shall not apply to the uplink of E-UTRA FDD Repeater operating in band 3, since it is already covered by the requirement in clause 4.2.2.2.2.
UTRA FDD Band I or E-UTRA Band 1	2 110 MHz to 2 170 MHz	-52 dBm	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 1.
	1 920 MHz to 1 980 MHz	-49 dBm	1 MHz	This requirement shall not apply to the uplink of E-UTRA FDD Repeater operating in band 1, since it is already covered by the requirement in clause 4.2.2.2.2.
UTRA FDD Band III or E-UTRA Band 3	1 805 MHz to 1 880 MHz	-52 dBm	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 3.
	1 710 MHz to 1 785 MHz	-49 dBm	1 MHz	This requirement shall not apply to the uplink of E-UTRA FDD Repeater operating in band 3, since it is already covered by the requirement in clause 4.2.2.2.2.
UTRA FDD Band VIII or E-UTRA Band 8	925 MHz to 960 MHz	-52 dBm	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 8.
	880 MHz to 915 MHz	-49 dBm	1 MHz	This requirement shall not apply to the uplink of E-UTRA FDD Repeater operating in band 8, since it is already covered by the requirement in clause 4.2.2.2.2.
E-UTRA Band 28	758 MHz to 803 MHz	-52 dBm	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 20 or 28.
	703 MHz to 748 MHz	-49 dBm	1 MHz	This requirement shall not apply to the uplink of E-UTRA FDD Repeater operating in band 28, since it is already covered by the requirement in clause 4.2.2.2.2.
NOTE 1: As set out in the definition in clause 4.2.3.1, the co-existence requirements in this table shall not apply for the 10 MHz frequency range immediately outside the repeaters operating band frequency range of an operating band (see table 1-1). This is also the case when the repeaters operating band frequency range is adjacent to the band for the protected system in the table. NOTE 2: Where the table has two entries for the same or overlapping frequency ranges, both limits shall be applied. NOTE 3: The requirements of -53 dBm/100 kHz in this table for the uplink direction of the Repeater reflect what can be achieved with present state of the art technology and are based on a coupling loss of 73 dB between a Repeater and a UTRA TDD BS receiver.				

Tabel 17. *General input intermodulation requirement*

f_1 offset	Interfering signal levels	Type of signals	Measurement bandwidth
1,0 MHz	-40 dBm	2 CW carriers	1 MHz

Tabel 18. *General input intermodulations limit*

Limit for the increase of power in the pass band
+11,2 dB

Tabel 19. *Input intermodulation requirements for interfering signals in co-existing other systems*

Co-existence with other systems	Frequency of interfering signals	Interfering signal levels	Type of signals	Measurement bandwidth	Note
GSM900	876 MHz to 915 MHz	-15 dBm	2 CW carriers	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 8, since it is already covered by the requirement in clause 4.2.5.2.1.
DCS1800	1 710 MHz to 1 785 MHz	-15 dBm	2 CW carriers	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 3, since it is already covered by the requirement in clause 4.2.5.2.1.
UTRA FDD band I or E-UTRA band 1	1 920 MHz to 1 980 MHz	-15 dBm	2 CW carriers	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 1, since it is already covered by the requirement in clause 4.2.5.2.1.
UTRA FDD band III or E-UTRA band 3	1 710 MHz to 1 785 MHz	-15 dBm	2 CW carriers	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 3, since it is already covered by the requirement in clause 4.2.5.2.1.
UTRA FDD band VIII or E-UTRA band 8	880 MHz to 915 MHz	-15 dBm	2 CW carriers	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 8, since it is already covered by the requirement in clause 4.2.5.2.1.
E-UTRA band 28	703 MHz to 748 MHz	-15 dBm	2 CW carriers	1 MHz	This requirement shall not apply to E-UTRA FDD Repeater operating in band 20 or 28, since it is already covered by the requirement in clause 4.2.5.2.1.
NOTE: The co-existence requirements in this table shall not apply when the repeaters pass band frequency range is adjacent to the frequency range of the co-existence requirement in this table. The current state-of-the-art technology does not allow a single generic solution for co-existence.					

Tabel 20. *General input intermodulations limit*

Limit for the increase of power in the pass band
+11,2 dB

Tabel 21. *Interfering and wanted signals for the output intermodulation requirement*

Parameter	Value
Wanted signal	E-UTRA signal of maximum channel bandwidth $BW_{Channel}$
Interfering signal type	E-UTRA signal of channel bandwidth 5 MHz
Interfering signal level	Mean power level 30 dB below the mean power of the wanted signal
Interfering signal centre frequency offset from wanted signal carrier centre frequency	$-BW_{Channel}/2$ - 12,5 MHz $-BW_{Channel}/2$ - 7,5 MHz $-BW_{Channel}/2$ - 2,5 MHz $BW_{Channel}/2$ + 2,5 MHz $BW_{Channel}/2$ + 7,5 MHz $BW_{Channel}/2$ + 12,5 MHz
NOTE: Interfering signal positions that are partially or completely outside of the downlink operating band of the repeater are excluded from the requirement.	

BAB III
METODE PENGUJIAN

Pengujian Persyaratan Utama terhadap Alat Telekomunikasi dan/atau Perangkat Telekomunikasi *Repeater* dilaksanakan sesuai dengan:

a. Tabel 22 dan Tabel 23; atau
b. metode uji yang ditetapkan oleh Direktur Jenderal

Tabel 22. Metode Pengujian Persyaratan Umum.

Persyaratan	Metode Pengujian
Keselamatan Listrik	Sesuai dengan SNI IEC 60950-1:2016, SNI IEC 62368-1:2014, dan/atau IEC 62368-1.
EMC (emisi)	Sesuai dengan ETSI EN 301 489-1, ETSI EN 301 489-52, SNI IEC CISPR 32:2015, dan/atau IEC CISPR 32.

Tabel 23. Metode Pengujian Persyaratan Utama *Repeater*

Parameter Uji	Metode Pengujian
Repeater Output Power	Sesuai dengan: a. Klausul 5.3.3 ETSI EN 301 908-15; atau b. Klausul 6.4 pada dokumen ETSI TS 136 143
ACRR	Sesuai dengan: a. Klausul 5.3.6 ETSI EN 301 908-15; atau b. Klausul 13.2.3 pada dokumen ETSI TS 136 143
Operating Band Unwanted Emissions	Sesuai dengan: a. Klausul 5.3.1 ETSI EN 301 908-15; atau b. Klausul 9.1.4 pada dokumen ETSI TS 136 143
Repeater Spurious Emission 3)	Sesuai dengan: a. Klausul 5.3.2 ETSI EN 301 908-15; atau b. Klausul 9.2.4 pada dokumen ETSI TS 136 143
Repeater Input Intermodulation 3)	Sesuai dengan: a. Klausul 5.3.4 ETSI EN 301 908-15; atau b. Klausul 11.4 pada dokumen ETSI TS 136 143
Repeater Output Intermodulation	Sesuai dengan: a. Klausul 5.3.7 ETSI EN 301 908-15; atau b. Klausul 12.4 pada dokumen ETSI TS 136 143
Radiated Emission	Sesuai dengan: a) Klausul 4.2.3 ETSI EN 301 908-1; b) Klausul 8.2.1 ETSI TS 136 113; atau c) Klausul 8.2.1 3GPP TS 36.113
Catatan: 1) ETSI TS 136 143 dapat diganti dengan 3GPP TS 36.143 2) ETSI TS 136 106 dapat diganti dengan 3GPP TS 36.106 3) Parameter *Repeater Spurious Emission* dan *Repeater Input Intermodulation* untuk *Co-location* dengan *Repeater* atau *BS* lain termasuk *voluntary*.	